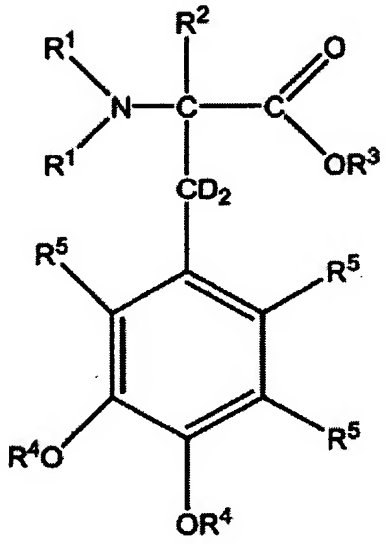
Patent Claims

1.Deuterated catecholamine derivatives of the general formula I



Formula I

wherein

R^1 is H or D, R^2 indicates H or D, R^3 is H, D, C_1-C_6 alkyl or C_5 to C_6-cycloalkyl, deuterated C_1 to C_6-alkyl or C_5 to C_6-cycloalkyl, R^4 indicates H or D and R^5 is H or D.

2. Deuterated catecholamine derivatives according to claim 1, wherein R^1 is H or D, R^2 indicates H or D, R^3 is H, D, C_1 to C_6-alkyl or C_5 to C_6-cycloalkyl, deuterated C_1 to C_6-alkyl or deuterated C_5 to C_6-cycloalkyl, R^4 indicates H or D and R^5 is D.

3. Deuterated catecholamine derivatives according to claim 1, wherein R^1 is H or D, R^2 indicates D, R^3 is D, C_1 to C_6-alkyl or C_5 to C_6-cycloalkyl, deuterated C_1 to C_6-alkyl or

deuterated C_5 to C_6-cycloalkyl, R^4 indicates H or D and R^5 is D.

4. Deuterated catecholamine derivatives according to claim 1, wherein R^1 is H or D, R^2 indicates D, R^3 is H, D, C_1 to C_6-alkyl or C_5 to C_6-cycloalkyl, deuterated C_1 to C_6-alkyl or deuterated C_5 to C_6-cycloalkyl, R^4 indicates H or D and R^5 is D.

5. Deuterated catecholamine derivatives according to the general formula I, wherein R^1 is H or D, R^2 indicates D, R^3 is C_1 to C_6-alkyl or C_5 to C_6-cycloalkyl, R^4 indicates H or D and R^5 is D.

6. Deuterated catecholamine derivatives according to claim 1, wherein R^1 is H or D, R^2 indicates D, R^3 is methyl, R^4 indicates H or D and R^5 is D.

7. Deuterated catecholamine derivatives according to claim 1, wherein R^1 is H or D, R^2 indicates D, R^3 is ethyl, R^4 indicates H or D and R^5 is D.

8. Deuterated catecholamine derivatives according to claim 1, wherein R^1 is H or D, R^2 indicates D, R^3 is perdeuteroethyl, R^4 indicates H or D and R^5 is D.

9. Deuterated catecholamine derivatives according to claim 1, wherein R^1 is H or D, R^2 indicates H or D, R^3 is perdeuteroethyl, R^4 indicates H or D and R^5 is D.

10. Deuterated catecholamine derivatives according to claim 1, wherein R^1 is H or D, R^2

indicates H or D, R^3 is perdeuteroethyl, R^4 indicates D and R^5 is H or D.

11. L-2-amino-3,3-dideutero-3-(3,4-dihydroxyphenyl) propionic acid

12. L-2-amino-3,3-dideutero-3-(3,4-dihydroxyphenyl) methyl propionate

13. L-2-amino-3,3-dideutero-3-(3,4-dihydroxyphenyl) ethyl propionate

14. L-2-amino-3,3-dideutero-3-(3,4-dihydroxyphenyl) cyclohexyl propionate

15. L-2-amino-3,3-dideutero-3-(3,4-dihydroxyphenyl) perdeuteromethyl propionate

16. L-2-amino-3,3-dideutero-3-(3,4-dihydroxyphenyl) perdeuteroethyl propionate

17. L-2-amino-3,3-dideutero-3-(3,4-dihydroxyphenyl) perdeuterocyclohexyl propionate

18. L-2-amino-2,3,3-trideutero-3-(3,4-dihydroxyphenyl) propionic acid

19. L-2-amino-2,3,3-trideutero-3-(3,4-dihydroxyphenyl) methyl propionate

20. L-2-amino-2,3,3-trideutero-3-(3,4-dihydroxyphenyl) ethyl propionate

21. L-2-amino-2,3,3-trideutero-3-(3,4-dihydroxyphenyl) cyclohexyl propionate

22. L-2-amino-2,3,3-trideutero-3-(3,4-dihydroxyphenyl) perdeuteromethyl propionate

23. L-2-amino-2,3,3-trideutero-3-(3,4-dihydroxyphenyl) perdeuteroethyl propionate

24. L-2-amino-2,3,3-trideutero-3-(3,4-dihydroxyphenyl) perdeuterocyclohexyl propionate

25. L-2-amino-2,3,3-trideutero-3-(2,3,6-trideutero-4,5-dihydroxyphenyl) propionic acid

26. L-2-amino-2,3,3-trideutero-3-(2,3,6-trideutero-4,5-dihydroxyphenyl) methyl propionate

27. L-2-amino-2,3,3-trideutero-3-(2,3,6-trideutero-4,5-dihydroxyphenyl) ethyl propionate

28. L-2-amino-2,3,3-trideutero-3-(2,3,6-trideutero-4,5-dihydroxyphenyl) cyclohexyl propionate

29. L-2-amino-2,3,3-trideutero-3-(2,3,6-trideutero-4,5-dihydroxyphenyl) perdeuteromethyl propionate

30. L-2-amino-2,3,3-trideutero-3-(2,3,6-trideutero-4,5-dihydroxyphenyl) perdeuteroethyl propionate

31. L-2-amino-2,3,3-trideutero-3-(2,3,6-trideutero-4,5-dihydroxyphenyl) perdeuterocyclohexyl propionate

32. L-2-amino-2,3,3-trideutero-3-(2,3,6-trideutero-4,5-dideuteroxyphenyl) perdeuterocyclohexyl propionate

33. L-2-amino-3,3-dideutero-3-(4,5-dideuteroxyphenyl) perdeuterocyclohexyl propionate

34. Use of the deuterated catecholamine derivatives according to one of claims 1 to 33 as well as physiologically compatible salts thereof, for the treatment of dopamine deficiency diseases or diseases which are based on disrupted tyrosine transport or disrupted tyrosine decarboxylase, such as Parkinson's disease, restless leg syndrome, dystonia, for inhibiting prolactin secretion, for stimulating the release of growth hormone, for the treatment of neurological symptoms of chronic manganese intoxications, of amyotrophic lateral sclerosis and of multiple system atrophy.

35. Use of the deuterated catecholamine derivatives according to one of claims 1 to 33 as well as physiologically compatible salts thereof, in combination with an enzyme inhibitor or several enzyme inhibitors, for the treatment of dopamine deficiency diseases or diseases which are based on disrupted tyrosine transport or disrupted tyrosine decarboxylase, such as Parkinson's disease, restless leg syndrome, dystonia, for inhibiting prolactin secretion, for stimulating the release of growth hormone, for the treatment of neurological symptoms of chronic manganese intoxications, of amyotrophic lateral sclerosis and of multiple system atrophy.

36. Use of deuterated catecholamine derivatives according to claim 35 as well as physiologically

compatible salts thereof, further characterized in that the enzyme inhibitor or the enzyme inhibitors involve decarboxylase inhibitors and/or catechol-O-methyltransferase inhibitors and/or monoamine oxidase inhibitors and/or β-hydroxylase inhibitors.

37. Use of deuterated catecholamine derivatives according to claim 36 as well as physiologically compatible salts thereof, further characterized in that the decarboxylase inhibitor is selected from the group consisting of D,L-serine 2-(2,3,4-trihydroxybenzyl) hydrazide (benserazide), (-)-L-α-hydrazino-3,4-dihydroxy-α-methylhydrocinnamic acid (carbidopa), L- serine 2-(2,3,4-trihydroxybenzyl) hydrazide, glycine 2-(2,3,4-trihydroxybenzyl) hydrazide and L-tyrosine 2-(2,3,4-trihydroxybenzyl) hydrazide as well as physiologically compatible salts thereof.

38. Use of the deuterated catecholamine derivatives according to claim 36 as well as physiologically compatible salts thereof further characterized in that the catechol-O-methyltransferase inhibitor is selected from entacapone and cabergoline as well as physiologically compatible salts thereof.

39. Use of the deuterated catecholamine derivatives according to claim 36 as well as physiologically compatible salts thereof, further characterized in that the monoamine oxidase inhibitor is selected from the group consisting of selegiline, moclobemide and tranylcypromine as well as physiologically compatible salts thereof.

40. Use of the deuterated catecholamine derivatives according to claim 36 as well as physiologically compatible salts thereof, further characterized in that the β-hydroxylase inhibitor

is selected from calcium 5-butyl picolinate and calcium 5-pentyl picolinate as well as physiologically compatible salts thereof.

41. Use of the deuterated catecholamine derivatives according to one of claims 1 to 33 as well as physiologically compatible salts thereof, for the production of pharmaceuticals for the treatment of Parkinson's disease, restless leg syndrome, of amyotrophic lateral sclerosis and of multiple system atrophy.

42. A pharmaceutical composition, which contains deuterated catecholamined according to one of claims 1 to 33 as well as physiologically compatible salts thereof, for the treatment of Parkinson's disease, of restless leg syndrome, of dystonia, for inhibiting prolactin secretion, for stimulating the release of growth hormone, for the treatment of neurological symptoms of chronic manganese intoxications, of amyotrophic lateral sclerosis and of multiple system atrophy, in addition to pharmaceutically compatible adjuvants and additives.

43. A pharmaceutical composition, which contains deuterated catecholamine derivatives according to one of claims 1 to 33 as well as physiologically compatible salts thereof, for the treatment of Parkinson's disease, restless leg syndrome, dystonia, for inhibiting prolactin secretion, for stimulating the release of growth hormone, for the treatment of neurological symptoms of chronic manganese intoxications, of amyotrophic lateral sclerosis and of multiple system atrophy, as well as one or more enzyme inhibitors, in addition to pharmaceutically compatible adjuvants and additives.

44. The pharmaceutical composition according to claim 43, further characterized in that the enzyme inhibitor or the enzyme inhibitors involve decarboxylase inhibitors and/or catechol-O-methyltransferase inhibitors and/or monoamine oxidase inhibitors and/or β-hydroxylase inhibitors.

45. The pharmaceutical composition according to claim 43, further characterized in that the decarboxylase inhibitor is selected from the group consisting of D,L-serine 2-(2,3,4-trihydroxybenzyl) hydrazide (benserazide), (-)-L-α -hydrazino-3,4-dihydroxy-α-methylhydrocinnamic acid (carbidopa), L-serine 2-(2,3,4-trihydroxybenzyl) hydrazide, glycine 2-(2,3,4-trihydroxybenzyl) hydrazide and L-tyrosine 2-(2,3,4-trihydroxybenzyl) hydrazide as well as physiologically compatible salts thereof.

46. The pharmaceutical composition according to claim 43, further characterized in that the catechol-O-methyltransferase inhibitor is selected from entacapone and cabergoline as well as physiologically compatible salts thereof.

47. The pharmaceutical composition according to claim 43, further characterized in that the monoamine oxidase inhibitor is selected from the group consisting of selegiline, moclobemide and tranylcypromine as well as physiologically compatible salts thereof.

48. The pharmaceutical composition according to claim 43, further characterized in that the β-hydroxylase inhibitor is selected from calcium 5-butyl picolinate and calcium 5-pentyl picolinate as well as physiologically compatible salts thereof.

49. Use of the deuterated catecholamine derivatives according to one of claims 1 to 33 as well as physiologically compatible salts thereof, for the prophylaxis of psychoses, particularly also of schizophrenia, as well as for the treatment of acute psychoses, particularly in the case of negative symptomatology and particularly also schizophrenia.

50. Use of the deuterated catecholamine derivatives according to one of claims 1 to 33 as well as physiologically compatible salts thereof, in combination with one or more enzyme inhibitors, for the prophylaxis of psychoses, as well as for the treatment of acute psychoses, particularly in the case of negative symptomatology.

51. Use of the deuterated catecholamine derivatives according to claim 50 as well as physiologically compatible salts thereof, further characterized in that the enzyme inhibitor or the enzyme inhibitors involve decarboxylase inhibitors and/or catechol-O-methyltransferase inhibitors and/or monoamine oxidase inhibitors and/or β-hydroxylase inhibitors.

52. Use of the deuterated catecholamine derivatives according to claim 51 as well as physiologically compatible salts thereof, further characterized in that the decarboxylase inhibitor is selected from the group consisting of D,L-serine 2-(2,3,4-trihydroxybenzyl) hydrazide (benserazide), (-)-L-α-hydrazino-3,4-dihydroxy-α-methylhydrocinnamic acid (carbidopa), L-serine 2-(2,3,4-trihydroxybenzyl) hydrazide, glycine 2-(2,3,4-trihydroxybenzyl) hydrazide and L-tyrosine 2-(2,3,4-trihydroxybenzyl) hydrazide as well as physiologically compatible salts thereof.

53. Use of the deuterated catecholamine derivatives according to claim 51 as well as physiologically compatible salts thereof, further characterized in that the catechol-O-methyltransferase inhibitor is selected from entacapone and cabergoline as well as physiologically compatible salts thereof.

54. Use of the deuterated catecholamine derivatives according to claim 51 as well as physiologically compatible salts thereof, furthercharacterized in that the monoamine oxidase inhibitor is selected from the group, consisting of selegiline, moclobemide and tranylcypromine as well as physiologically compatible salts thereof.

55. Use of the deuterated catecholamine derivatives according to claim 51 as well as physiologically compatible salts thereof, further characterized in that the β-hydroxylase inhibitor is selected from calcium 5-butyl picolinate and calcium 5-pentyl picolinate as well as physiologically compatible salts thereof.

56. Use of the deuterated catecholamine derivatives according to one of claims 1 to 33 as well as physiologically compatible salts thereof, for the production of pharmaceuticals for the prophylaxis of psychoses as well as for the treatment of acute psychoses, particularly in the case of negative symptomatology.

57. A pharmaceutical composition, which contains deuterated catecholamines according to one of claims 1 to 33 as well as physiologically compatible salts thereof, for the prophylaxis of

psychoses as well as for the treatment of acute psychoses, particularly in the case of negative symptomatology, in addition to pharmaceutically compatible adjuvants and additives.

58. Pharmaceutical composition, which contains deuterated catecholamine derivatives according to one of claims 1 to 33 as well as physiologically compatible salts thereof, for the prophylaxis of psychoses and for the treatment of acute psychoses, particularly in the case of negative symptomatology, as well as one or more enzyme inhibitors, in addition to pharmaceutically compatible adjuvants and additives.

59. The pharmaceutical composition according to claim 58, further characterized in that the enzyme inhibitor or the enzyme inhibitors involve decarboxylase inhibitors and/or catechol-O-methyltransferase inhibitors and/or monoamine oxidase inhibitors and/or β-hydroxylase inhibitors.

60. The pharmaceutical composition according to claim 59, further characterized in that the decarboxylase inhibitor is selected from the group consisting of D,L-serine 2-(2,3,4-trihydroxybenzyl) hydrazide (benserazide), (-)-L-α -hydrazino-3,4-dihydroxy-α-methylhydrocinnamic acid (carbidopa), L-serine 2-(2,3,4-trihydroxybenzyl) hydrazide, glycine 2-(2,3,4-trihydroxybenzyl) hydrazide and L-tyrosine 2-(2,3,4-trihydroxybenzyl) hydrazide as well as physiologically compatible salts thereof.

61. The pharmaceutical composition according to claim 59, further characterized in that the catechol-O-methyltransferase inhibitor is selected from entacapone and cabergoline as well as

physiologically compatible salts thereof.

62. The pharmaceutical composition according to claim 59, further characterized in that the monoamine oxidase inhibitor is selected from the group consisting of selegiline, moclobemide and tranylcypromine as well as physiologically compatible salts thereof.

63. The pharmaceutical composition according to claim 59, further characterized in that the β-hydroxylase inhibitor is selected from calcium 5-butyl picolinate and calcium 5-pentyl picolinate as well as physiologically compatible salts thereof.